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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/510,679 | 10/08/2004 | Yoshinori Miyaki | XA-10186 | 4946 |

181 7590 06/21/2006

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| EXAMINER |
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KUNZER, BRIAN

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| ART UNIT | PAPER NUMBER |
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2814

DATE MAILED: 06/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/510,679

Applicant(s)

MIYAKI ET AL.

Examiner

Brian Kunzer

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 58-67 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 58-67 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>3/21/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Amendments

The amendment filed March 21st, 2006 has been received and entered. In summary, claims 47-57 are cancelled and new claims 58-67 are added, thus claims 58-67 are pending examination. Nonelected invention claims 39-46 have been withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 58-60, 62, 64, and 66 are rejected under 35 U.S.C. 102(b) as being anticipated by Li (US Patent No. 6,348,729).

With respect to claim 58, Li teaches, from figs. 6-10 and columns 3 and 4, a method of manufacturing a semiconductor device, comprising the steps of:

- (a) providing a tape (250) having a main surface, a back surface opposed to the main surface, a product forming portion formed on the main surface, and a plurality of terminals (222a, 224) formed in a product forming portion (see column 3, lines 16-26); (fig. 6)
- (b) fixing a semiconductor element (210) to the main surface of the tape (250); (fig. 7)
- (c) electrically connecting a plurality of electrodes (212) formed over the semiconductor element (210) with the plurality of terminals (222a, 224) through wires (230, 232); (fig. 8)

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(d) sealing the semiconductor element (210), the wires (230, 232), the plurality of terminals (222a, 224), and the main surface of the tape (250) with a resin (240), and forming a sealing member; (fig. 9)

(e) after the step (d), peeling the tape (250) from the sealing member, and thereby exposing a part of each of the plurality of terminals (222a, 224) from the sealing member; (fig. 10) and

(f) forming a metal layer (solder paste) over the part of each of the plurality of terminals (222a, 224),

wherein there is no exposure of the plurality of terminals and terminal leads from the edges of the sealing member (i.e. they make complete contact); [Also in regards to this limitation it has been held that to be entitled to weight in method claims, the recited-structure limitations therein must affect the method in a manipulative sense, and not to amount to the mere claiming of a use of a particular structure. Ex parte Pfeiffer, 1962 C.D. 408 (1961).], and

wherein the metal layer is formed by a printing process. (See the described process of forming leads attached to the terminals (leads) (222a, 224) in column 4, line 61- column 5, line 5)

With respect to claim 59, Li teaches, from figs. 6-10 and columns 3, lines 34-63, the method wherein the plurality of terminals (222a, 224) are formed by affixing a metal foil (copper foil) to the main surface of the tape and thereafter etching the metal foil selectively.

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With respect to claim 60, Li teaches, from figs. 6-10 and columns 3, lines 34-63, the method wherein the metal foil (copper) is affixed to the main surface of the tape through a first adhesive (polyimide).

With respect to claim 62, Li teaches, from fig. 10, the method wherein a back surface of the semiconductor element (210) is exposed from the sealing member.

With respect to claim 64, Li teaches, from figs. 6-10 and columns 3, lines 34-67, the method wherein the plurality of terminals (222a, 24) are fixed to the tape (250) through a first adhesive (the polyimide in the tape), and the semiconductor element (210) is fixed to the tape through a second adhesive (not shown, thermosetting adhesive, column 3, lines 65-67).

With respect to claim 66, Li teaches, from figs. 6-10 and columns 3, lines 34-67, the method wherein the tape is formed by a resin film selected from polyimide resin, ethylene-vinylacetate copolymer resin, polyolefin resin and methacrylate resin.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claim 61 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li (US Patent No. 6,348,729) as applied to claim 59 above, and further in view of Narushima (US Patent No. 5,298,304).

Li teaches, from figs. 6-10 and columns 3, lines 34-63, the method wherein the metal foil is bonded to the tape.

Li does not state that the metal foil is specifically compression-bonded to the tape by thermocompression bonding. This is most likely inherent though, as this is a well-known and commonly used method of forming TAB tape.

Nevertheless, Narushima, drawn to adhesive tapes for tape automated bonding (TAB), teaches from column 1, lines 15-51, that metal (copper) foil compression-bonded to the (adhesive) tape by thermocompression bonding is known.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention, to have the tape as described by Li be specifically formed by thermocompression bonding as disclosed by Narushima, since this forms a laminated tape suitable for TAB processes. (See column 1, lines 15-51.)

3. Claims 63 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (US Patent No. 6,348,729) as applied to claims 58 and 59 above, and further in view of Jung (US Patent No. 6,342,730).

With respect to claim 63, Li teaches, from figs. 6-10, the method as stated above.

Li does not specifically teach that the tape has a semiconductor element fixing piece, and the semiconductor element (210) is mounted over the semiconductor element fixing piece.

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However, Jung, drawn to TAB produced die packages, teaches from figs. 2 and 9, a tape (260) has a semiconductor element fixing piece (232), and the semiconductor element (210) is mounted over the semiconductor element fixing piece (232).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention, to have the method of forming the device of Li including a semiconductor element fixing piece as disclosed by Jung so as to allow for an enhanced attachment of the die to the sealing (packaging) body and better moisture resistance. (See column 2, Summary of the Invention.)

With respect to claim 65, Examiner takes the position that the material selected for the adhesive layer under the semiconductor element, in view of those used in the prior art, is non-critical to the applicant's invention. Li discloses all the limitations of the claimed invention - including gold or silver plating on the leads (222a, 224) (see column 3, lines 10-35) - except for specifically teaching that "a Pd plating film is formed over each of the plurality of terminals." It would have been obvious to one of ordinary skill in the art, at the time of invention, to have the gold or silver plating of Li's device to utilize palladium (Pd) instead, since it has been held to be within the general skill of a person in the art to select a known material on the basis of its suitability for the intended use (to provide better bonding for conductive wires from the semiconductor element) as a matter of obvious design choice. *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). Also, column 3, lines 7-25 of Jung et al. (USPN 6,342,730) is provided as further support of this position.

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4. Claim 67 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li (US Patent No. 6,348,729) as applied to claim 58 above, and further in view of Long (US Patent No. 5,173,766).

Li teaches, from figs. 6-10, the method as stated above.

Li does not teach that step (d) is carried out while the back surface of the tape is held by vacuum suction.

However, Long, drawn to the manufacture of semiconductor packages, teaches, from figs. 6A and 6B, vacuum suction (through 610,a,b) is used to hold the back surface of the tape (551) in the step of fixing a semiconductor element (24) to a carrier tape assembly (551). Also, vacuum suction (through hole 710b) used during wire connection process. (See fig. 7a and column 26, lines 34-37.)

Therefore, it would have been obvious to one of ordinary skill in the art, at the time of invention, to have the method of chip manufacturing of Li utilizing a vacuum suction process - as described by Long - to hold the tape in place during chip placement, wiring connection, or resin molding steps because this process provides a stable and accurate environment for these steps to be carried out (see column 26, lines 44-46) and the fact that vacuum holding is well known in the art. (See column 3, lines 28-32)

Response to Arguments

5. Applicant's arguments with respect to claims 58-67 have been considered but are moot in view of the new ground(s) of rejection.

Applicant makes the following argument in regards to the newly submitted claims

58-67:

New independent Claim 58 recites, inter alia, and that there is no exposure of the plurality of terminals and terminal leads from edges of the sealing member and that the metal layer over part of each of the plurality of terminals is formed by a printing process. Neither of these features is disclosed in the principal reference, Li et al. (U.S. Patent No. 6,348,729), relied upon in the rejection under 35 U.S.C. 5 102(b).

Applicant is referred to column 4, line 61- column 5, line 5 of Li et al. (U.S. Patent No. 6,348,729) which does teach these features.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Kunzer whose telephone number is (571) 272-5054. The examiner can normally be reached on Monday-Friday 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BK
6/8/06



ANH D. MAI
PRIMARY EXAMINER